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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,719	10/06/2003	Susan G. Yan	8540G-000169	2872
27572	7590	06/01/2005	EXAMINER	
HARNES, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			PURVIS, SUE A	
			ART UNIT	PAPER NUMBER
			1734	

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/679,719

Applicant(s)

YAN ET AL.

Examiner

Sue A. Purvis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) 15-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) ☐ Notice of Informal Patent Application (PTO-152) |
| 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>06 Oct 2003</u> . | 6) ☐ Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Claims 1-14 in the reply filed on 03 February 2005 is acknowledged. The traversal is on the ground(s) that the examination of the multiple inventions does not place a serious burden on the examiner. This is not found persuasive because the examiner disagrees and believes that the search and examination of all the invention does place amount to a burden.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4-7, 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilson et al. "Thin-film catalyst layers for polymer electrolyte fuel cell electrodes" (hereafter "Wilson").

Wilson discloses a method of making a membrane electrode assembly (MEA) comprising: forming a slurry including an ionomer (Nafion), a carbon electrically conductive material, a Pt catalyst and a glycerol¹ solvent mixed with water (Section 3.1, first paragraph); applying the slurry onto a substrate (Teflon (tetrafluoroethylene/

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polytetrafluoroethylene) blank in Fig. 1) which has sufficient structural integrity to be reusable (See Figure 1 and protocol step 4 on page 3); drying or removing the applied slurry in protocol step 5 on page 3 to form a film; bonding the film to the membrane (See Figure 1, step d); and peeling the Teflon blank from the film. (See Figure 1.)

Regarding claim 4, the substrate blank is Teflon and as admitted by the applicant in their specification, Teflon meets the criteria of having a suitable surface energy.

Furthermore, it is known that Teflon has a low surface energy within the claimed range.

Regarding claim 5, the solvent in Wilson also includes water.

Regarding claims 6 and 7, glycerol is an organic solvent with a boiling point greater than 100°C.

Regarding claim 9, hot-pressing of the catalyst/blank onto the membrane is performed at temperatures above the glass transition temperature of Nafion, which is 105 °C. (Protocol step 5, page 3.)

Regarding claim 11, the electrically conductive material is carbon and the catalyst is platinum.

Regarding claim 12, the ionically conductive material is Nafion which is a trade name for a perfluorosulfonate ionomer.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having

¹ Glycerol has a boiling point 290°C and mixed with water the boiling point will be lowered. Furthermore, as appreciated by one of skill in the art, the solvent/water concentrations produce a solvent having a desired boiling point for the particular application.

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ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 13, and 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson as applied to claim 1 above, and further in view of Tou (U.S. Patent No. 5,518,831).

Wilson does not disclose the step is of cleaning the substrate after peeling the substrate from the film with a solvent.

Wilson teaches that prior to using the blank upon which the catalyst film is formed, the substrate is first cleaned.

Tou teaches that the substrate surface should be clean (free from contamination). It can be cleaned by washing with an alcohol solvent such as isopropanol, methanol, etc. prior to application of the polymer/catalyst layer. This step removes dirt, contaminants, and additives such as wetting agents from the surface. (See paragraph bridging columns 7 and 8).

The motivation for cleaning the substrate surface with a solvent such as methanol prior to using the substrate is that it provides a clean surface upon which the catalyst layer can be deposited.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made based on the teachings of Tou to modify the teachings of Wilson by cleaning the substrate prior to use or reuse since it would have provided a clean surface upon which the catalyst layer would have been deposited on.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson as applied to claim 1 above.

Wilson does not discuss in detail the thickness of the Teflon blank, but Wilson does suggest that thickness of the material is important to an artisan in order to achieve a desired end.

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a substrate within the range of claim 3, because Wilson teaches the importance of thickness and as such, the examiner is taking official notice that the claimed range is within the purview of one of ordinary skill in the art based on experimentation and the ultimate design desired by the artisan.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson as applied to claim 1 above, and further in view of Artysiewicz et al. (US Patent No. 6,180,163 B1).

Wilson does not discuss in detail the thickness of the Teflon blank, but Wilson does suggest that thickness of the material is important to an artisan in order to achieve a desired end.

Artysiewicz discloses that the a blank 5 mils thick is within the purview of the artisan. (Col. 16, lines 8-13.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a substrate within the range of claim 3, because Wilson teaches the importance of thickness and Artysiewicz demonstrates that a thickness within the claimed range has been used previously.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson as applied to claim 1 above.

Wilson discloses using a glycerol and water solvent mixture, but it would have been obvious to one having ordinary skill in the art at the time the invention was made that additional solvents could be used as solvents and their properties are known to an artisan. An artisan would appreciate the possible advantages of using different solvents thus the examiner is taking official notice that one or all of the solvents in claim 6 are within the purview of one of ordinary skill to replace the glycerol in Wilson.

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9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson as applied to claim 1 above, and further in view of Grot (U.S. patent No. 5,330,860).

Wilson does not disclose how the material is coated onto the substrate.

Grot teaches using transfer catalyzation wherein an electrode ink comprising a platinum catalyst on a carbon supporting material is printed on a suitable substrate, such as TEFLON.RTM. or paper, it has been possible to form electrodes containing as little as 0.2 mgm/cm.sup.2 of precious metal. In particular, these electrodes, which are essentially decals formed from a supported platinum catalyst electrode ink are painted or sprayed on the substrate and then dried and hot pressed onto ion exchange membranes. This so-called decal process of applying the electrode ink to the surface of the membrane has been successful but involves the arduous process steps of forming the electrode decal and then transferring it to the membrane. (See paragraph bridging columns 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to coat the substrate in Wilson by printing or spraying the coating onto the substrate as taught by Grot '860 because it would have provided efficient and effective process for forming the catalyst layer onto the substrate to form a film.

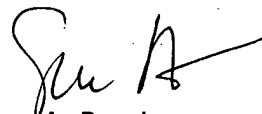
Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sue A. Purvis whose telephone number is (571) 272-1236. The examiner can normally be reached on Monday through Friday 9am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher A. Fiorilla can be reached on (571) 272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sue A. Purvis
Primary Examiner
Art Unit 1734

SP
May 30, 2005